What is claimed is:

1. An electrically programming & sensing unit for a field repairable system-on-a-chip (SOC) device, said electrically programming & sensing unit comprising:

a diode such that a cathode of said diode is connected to a VDD power;

an electrically programmable element with a first end connected to an anode of said diode and to a VPP power;

a pull-down transistor configured to conduct current from said VDD power or from said VPP power to ground through said electrically programmable element when turned on;

a latch configured to latch a value from a second end of said electrically programmable element; and

a multiplexor configured to receive a set of external inputs and to control the operation of said pull-down transistor based on said set of external inputs.

2. The electrically programming & sensing unit of claim 1, wherein said electrically programmable element has an initial state that is one of a high resistance and a low resistance and has a programmed state that is the other of said high resistance and said low resistance.

3. The electrically programming & sensing unit of claim 2, wherein a turn-on resistance of said pull-down transistor is substantially at least 10 times of said low resistance and is substantially at maximum $1/10^{th}$ of said high resistance.

4. An electrically programmable circuit for a field repairable system-on-a-chip (SOC) device, comprising:

a high voltage generator configured to supply a VPP power in response to a program_enable signal;

a scan chain configured to receive address bits indicating whether a redundant row or a column needs to be activated;

an electrically programming & sensing unit configured to receive a signal from said scan chain, said program_enable signal, and a power-on-reset signal such that upon activation of said program_enable signal, said electrically programming & sensing unit further configured to be programmed in response to said signal from said scan chain indicating a defective row or column should be fixed; and

a fuse-switch configured to receive an output of said electrically programming & sensing unit such that said electrically programming & sensing unit is able to activate/deactivate said fuse-switch.

5. The electrically programmable circuit of claim 4, further comprises a feedback connection from an output of said electrically programming & sensing unit to said scan chain.

6. The electrically programmable circuit of claim 4, wherein said electrically programming & sensing unit comprises:

a diode such that a cathode of said diode is connected to a VDD power;

an electrically programmable element with a first end connected to an anode of said diode and to said VPP power;

a pull-down transistor configured to conduct current from said VDD power or from said VPP power to ground through said electrically programmable element when turned on;

a latch configured to latch a value from a second end of said electrically programmable element; and

a multiplexor configured to:

receive said program_enable signal and said signal from said scan chain; and

output a signal which follows said signal from said scan chain to said pull-down transistor upon activation of said program_enable signal.

7. The electrically programmable circuit of claim 6, wherein said multiplexor is further configured to:

receive said power-on-reset signal; and

output a signal which follows said power-on-reset signal to said pull-down transistor upon deactivation of said program_enable signal.

8. The electrically programmable circuit of claim 6, wherein said electrically programmable element has an initial state that is one of high resistance and low resistance and has a programmed state that is the other of said high resistance and said low resistance.

9. The electrically programmable circuit of claim 8, wherein a turn-on resistance of said pull-down transistor is substantially at least 10 times of said low resistance and is substantially at maximum $1/10^{th}$ of said high resistance.

10. The electrically programmable circuit of claim 6, wherein said pull-down transistor is an NMOS transistor

11. The electrically programmable circuit of claim 4, wherein said fuse-switch comprises:

a fuse; and

a transistor configured to conduct current through said fuse when activated.

12. The electrically programmable circuit of claim 11, wherein said transistor of said fuse-switch is one of NMOS, PMOS, and bipolar transistor.

13. The electrically programmable circuit of claim 4, wherein said scan chain comprises a plurality of flip-flops.

14. A field-repairable system-on-a-chip (SOC) device, comprising:

at least one of a plurality of redundant rows and a plurality of redundant columns, wherein each of said redundant row or said redundant column includes a plurality of fuse boxes;

a plurality of usage indicators configured to indicate that corresponding redundant rows or corresponding redundant columns are in use;

a fuse map sensing circuit configured to sense and save data of said plurality of usage indicators; and

a fuse map scan chain configured to send out data sensed by said fuse map sensing circuit.

15. The field-repairable SOC device of claim 14, wherein each of said fuse boxes for said redundant rows and said redundant columns includes:

a fuse-switch; and

an electrically programming & sensing unit configured to control said fuse-switch.

16. The field-repairable SOC device of claim 14, wherein each of said usage indicators comprises a fuse.

17. The field-repairable SOC device of claim 14, wherein said fuse mapping circuit comprises:

a latch configured to latch value of said usage indicator; and

a transistor configured to cause said latch to latch the value of said usage indicator.

18. The field-repairable SOC device of claim 14, further comprising:

a high voltage generator configured to supply a VPP power in response to a program_enable signal;

a scan chain configured to receive address bits indicating of word and bit lines that should be corrected; and

a plurality of electrically programmable circuits, wherein each of said electrically programmable circuit comprises:

an electrically programming & sensing unit configured to receive a signal from said scan chain, said program_enable signal, and a power-on-reset signal such that upon activation of said program_enable signal, said electrically programming &

sensing unit further configured to be programmed in response to said signal from said scan chain indicating a defective row or column should be fixed; and

a fuse-switch configured to receive an output of said electrically programming & sensing unit such that said electrically programming & sensing unit is able to activate/deactivate said fuse-switch.

19. The field-repairable SOC device of claim 18, wherein said electrically programming & sensing unit comprises:

a diode such that a cathode of said diode is connected to a VDD power;

an electrically programmable element with a first end connected to an anode of said diode and to said VPP power;

a pull-down transistor configured to conduct current from said VDD power or from said VPP power to ground through said electrically programmable element when turned on;

a latch configured to latch a value from a second end of said electrically programmable element; and

a multiplexor configured to:

receive said program_enable signal and said signal from said scan chain; and

output a signal which follows said signal from said scan chain to said pull-down transistor upon activation of said program_enable signal.

20. The field-repairable SOC device of claim 19, wherein said multiplexor is further configured to:

receive said power-on-reset signal; and

output a signal which follows said power-on-reset signal to said pull-down transistor upon deactivation of said program_enable signal.

21. A method to package a field-repairable system-on-a-chip (SOC) device at a factory, comprising:

repairing said SOC device, using one or both of redundant rows and columns, prior to packaging said device;

marking usage of all redundant rows and columns;

retesting said SOC device; and

packaging said SOC device in response to said SOC device completing said retesting step satisfactorily.

22. The method of claim 21, wherein said repairing step comprises performing laser blown repairs on said redundant rows and columns.

23. The method of claim 21, wherein said marking step comprises blowing usage indicators corresponding to said redundant rows and columns.

24. A method to field repair a field-repairable system-on-a-chip (SOC) device at a factory, comprising:

performing a diagnostic test on said SOC device;

identifying unused redundant rows and columns;

electrically programming any of said unused redundant rows and columns; and

retesting said SOC device.

25. The method of claim 24, further comprising usage marking any used redundant rows and columns during the electrically programming step.

26. The method of claim 24, wherein said electrically programming step comprises:

shifting in an address of a defective row or column to a scan chain; and

applying a programming power VPP to a electrically programming and sensing unit associated with said address shifted in said scan chain.